Forty-Five User's Manual

45ME3 HD-MILSPEC HEAD AND COMBO UNIT

Variable Power Instrument Amplifiers

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Introduction

The Soultone 45ME3 HD-MILSPEC amplifier is a Class-A/B, all-tube, 32 Watt, two-channel head, with a sophisticated variable power supply derived from *Power Scaling*, a technology developed by Kevin O'Connor, and licensed from London Power, of Ontario, Canada. This manual should be read by all users of the Soultone 45ME3, including guitarists, sound engineers, recording engineers, and service technicians, in order to achieve the best possible performance and avoid damaging the amplifier, tubes, speaker cabinets, other equipment, or causing harm to human beings.

The 45ME3 is the latest version of the Soultone Forty-Five Variable Power Instrument Amplifier, and due to significant changes to the amplifier, including an exclusive transformer set, new layout, feature changes, and bias adjustment, this amplifier warrants a specific manual. This manual applies exclusively to the 45ME3 head and 212 combo units.

As you can see from its front panel layout, the 45ME3 appears outwardly to be a simple British style valve amplifier. Its two channels - Channel I and Channel II - each have two inputs (High and Low sensitivity) and separate Volume controls, while sharing the amplifier's four tone controls: Presence, Bass, Middle and Treble. Yet closer inspection reveals a rather more complex amplifier. There are push pull pots, power controls providing controlled distortion levels, and channel bridging and cascading features. The back panel reveals an even further complexity, with switched to emulate a range of early plexi type amplifier models. A further refinement is an all tube effects loop for adding effects between the preamp and power amp stages of the amplifier. This all tube effects loop can be removed completely from the circuit with a True Bypass switch, for the purist to achieve the most vintage style tones.

Traditional tube amplifiers sound best when turned up full – yielding aggressive but sweetly distorted, harmonically rich, thick tones resulting from their power tubes being overdriven. Thanks to its Variable Power *Power-Scaling* implementation, the Soultone 45ME3 has the astonishing capability to achieve this classic sound at nearly every volume level. By careful adjustment of its controls, the 45ME3 can produce any mixture of distortion, from both the preamplifier, and power amplifier tubes, from subtle nuanced bloom and sparkle, to full blown clipping. Running the amplifier at lower power settings, with the Variable Power controls, can also extend the tube life of your valuable NOS tubes.

Whereas most tube amplifiers are reputed to have issues with noise and hum, the Soultone is surprisingly quiet, thanks to its modern grounding, shielding, and HD MILSPEC components and wiring.

We hope that you will enjoy your Soultone 45ME3, and have written this manual to help you master its many features

LETHAL SHOCK DANGER!
Tube amplifiers are potentially dangerous equipment, having lethal voltages inside, and tubesoperating at high temperature ranges. The back cover of your amplifier should always be installed when the power cord is plugged into the power receptacle. The amplifier should only be used with well grounded, three prong (separate ground) power receptacles, and only operated at a safe distance from water, under an overhead covering, to protect you, or the musician playing the amplifier, from the danger of electrical shock.

NOISE POLLUTION LOSS OF HEARING DANGER!
Guitar amplifiers operate at high decibel levels. Never place your head next to the speaker cone while adjusting the amplifier or at high volume levels. Use adequate hearing protection when playing at full volume, and do not expose children to high-frequency or high-volume noise. Failure to comply could result in partial or complete loss of hearing.

FIRE AND SERIOUS BURN INJURY RISK!
Tubes operate at high temperature, and can cause burn injuries, or even fire. Never operate your amplifier without the back safety cover installed, never store items in the tube compartment, and always allow tubes to cool to room temperature prior to removal.

CAUTION!
The 45ME3 amplifier should only be serviced by qualified tube service repair personnel. Only repair work authorized by Soultone Amplification, Inc., will be qualified for warranty, and unauthorized repairs or modifications will void your warranty, and could compromise the safety features of your amplifier, resulting in shorter tube life, increased risk of electrocution, fire hazard, and possibly even death

Technical Information

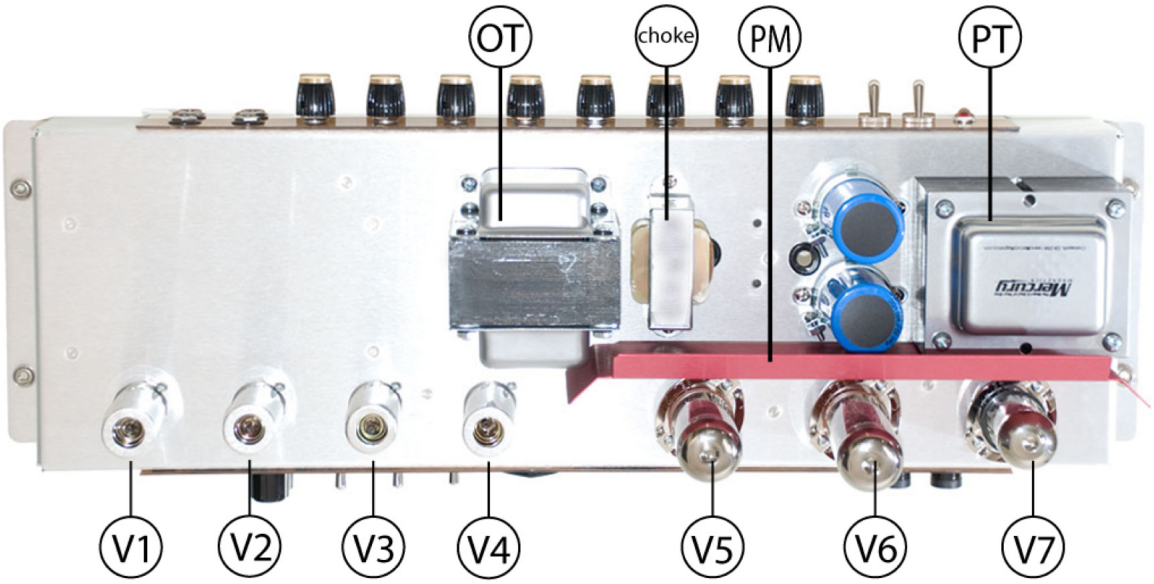

Figure 1. Chassis Layout

Chassis

The high-grade 5052-H32 aluminum chassis supports and protects the amplifier components, prevents transformer coupling, and is the main shield. This unit has been tested to withstand functional deformation in a 10 ft. drop with transformers installed, when properly attached to the head cabinet. The chassis has integrated electrical safety features, including isolated grounding posts, fasteners, and mounting studs, and is manufactured with keyed component holes to avoid control slip, or "twist out". Only personnel or service facilities authorized by Soultone Amplification should remove the amplifier chassis from the cabinet. The chassis should never be drilled, tapped, cut, or modified in any fashion.

CAUTION:

The Heat shield, **PM**, is a part of the chassis safety and shielding system, and should never be removed, as the ISOTOP MOSFET module has lethal voltages present, and can also be a source of radio frequency interference. Do not operate your amplifier with the chassis removed from the cabinet, or with this shield removed. This shield also protects the transformer set from heat damage, especially important in the combo amplifiers.

Transformers and Choke

The *Mercury Edition* of the 45ME3 utilizes a set of Mercury Magnetics transformers, designed exclusively for the Soultone 45 amplifier. Mercury transformers are built to modern standards, with the best currently available materials, with a sound widely regarded as the best available. The 45ME3 power trasformer, **PT**, was developed by examination of the characteristics of the original Radiospares transformer, under load, in an original JTM45. This transformer gives the same results in our own JTM45 style circuit (which is not a stock JTM45). The output transformer, **OT**, is a special version of the Mercury tone-clone of the original Radio Spares unit, also used in the JTM45 amplifier, with changes to the primary impedance and the addition of separate impedance taps, including 2, 4, 8, and 16 ohm for accurate impedance matching of KT66 and EL34 tubes. The Mercury **CHOKE** is a true U-Clamp design, and is a true specification replacement part for most 60's plexi type amplifiers.

Tube compliment:

The 45ME3 utilizes three 12AX7 and one 5751 in the pre-amp, and a duet of octal power valves work in push-pull in the power amplifier. The four tubes in the pre-amp are utilized as follows:

V1 acts as the pre-amp gain stage for the Bright (Volume 1) and Normal (Volume 2) channels - each half of the tube (the 12AX7 is a dual-triode, consisting of Va and Vb) acting as a dedicated gain stage for each channel.

V2 is common to both channels, which are passively summed before reaching this valve. V2a, the first half of V2 acts as a gain stage, common to both channels, boosting the signal, and then driving the second half of the valve, V2b, which is designed as a cathode follower. The cathode follower is a unity gain device acting as a buffer, yielding a low impedance signal with which to optimally drive the tone stack.

Special Note : The second gain stage of this circuit can be switched to supply a cathode bypass capacitor that boosts the guitar frequencies, actuated by the push-pull FAT feature on the BASS control, discussed in the section titled "Front Panel Layout".

V3 acts as an effects loop buffer tube, adjusting the level of the signal down to effects unit level, matching the impedance of effects units, with variable send and return level controls. Return instrument feeds are then boosted back up with another cathode follower, and matching the impedance for the phase inverter stage.

Special Note 2: The FX loop can be bypassed with the mode set to "True Bypass" effectively putting the output of the tone stack directly to the coupling cap for V4. It can also be used with any 12A_7 tube, with a guitar cable connecting the SEND to RETURN jacks, for an additional gain stage.

V4 acts as the amplifier's phase-splitter. This device splits the signal into two halved components, that are180 degree out-of-phase with each other, which then feeds the 45ME3's push-pull output stage.

The power amplifier tubes are composed of **V5** and **V6**, working in a type AB push-pull amplifier design. These tubes can be any mix of the following octal power tube types: EL34 (standard on the Mercury Edition), KT66 (standard on the Heyboer Edition), 6L6GC, 5881, or 6L6GT. The tubes are individually biased through a scaled bias control, and have plate voltages controlled through a scaled power control, giving a variable power range from 10 mw to 40 watts.

V7 is a GZ34/5AR4 tube. When the amplifier standby is switched to SS (solid state) this tube is unused.

Construction Details and Components

Construction:
Soultone amplifiers are made of the highest grade materials and components available, and meticulously hand-wired with Teflon coated, silver-plated, MILSPEC wire (actual certification level of the wire we use is for aircraft control systems wiring), and soldered using lead-free silver.

High grade components are used, including MILSPEC plastic conductive potentiometers, capacitors by Sprague and F&T, a mixture of resistors including carbon film, metal film, metal oxide, and, where appropriate for vintage tone, actual Allen Bradley NOS carbon composite resistors. Sozo "mustard" style capacitors are used standard, and by special order actual NOS Mullard capacitors are offered. The impressive component line up of the 45ME3 with NOS components is unmatched by any production amplifier.

Hybrid PCB Boards: The hybrid PCB board used in the Soultone 45ME3 is an industry first. The circuit traced part of the board provides a reliable implementation of the Power Scaling circuit, referenced as Variable Power by London Power, but nevertheless derived and licensed from their own Power Scaling technology. By using a circuit traced board for this portion of the circuit, we have greatly reduced noise, and increased reliability over hand-wired implementations of power scaling.

Variable Power MOSFET: The Soultone 45ME3, and all future Soultone Variable Power amplifiers, use the most robust MOSFET solution of any current power scaled amplifier. The ISOTOP MOSFET power module of the 45ME3 was adapted from welding equipment, and can dissipate over 600watts of continuous power. Due to its external mounting, and extremely high temperature and wattage ratings, this module needs NO active cooling.

Front and Rear Panels: Extra thick, gold colored, rear LASER engraved, acrylic. Specific details pertaining to the front panel features can be found in this manual

Cabinet Construction: High-grade, flawless (void-free) Baltic birch-ply with dovetailed joints for maximum strength. The sides, top and bottom are .75" ply, while the front baffle is constructed from .5" ply and the back of the cabinet is .25" ply. The cabinet is covered standard in a heavy-duty Black Levant vinyl

Front Panel Control Layout

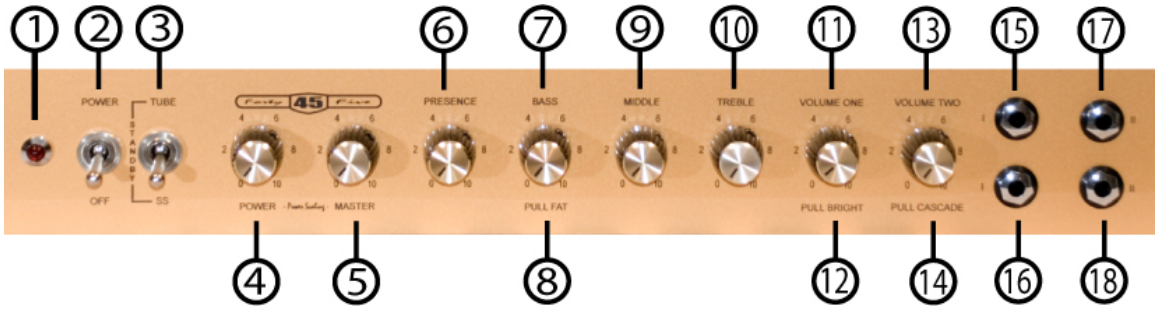

Figure 2. Front panel controls

1. INDICATOR

This indicator will light up when your amplifier is receiving the correct mains power and is switched on. It will not be lit when the amplifier is switched off and/or is not receiving mains power. It is a rugged MILSPEC LED device, powered off of the 6.3VAC tube heater filaments.

2. POWER SWITCH

This is the On/Off switch for mains power to the amplifier. Make sure that the amplifier is switched off and the appliance cord is unplugged from the electrical outlet prior to relocation.

3. THREE-WAY STANDBY AND RECTIFIER SELECTOR SWITCH

The 45ME3 is equipped with a three-way Standby and Rectifier selector switch. The center, or middle position, is Standby, upward selects Tube, and downward selects the Solid State rectifier, built into the amplifier. There is no wait required when switching between rectifiers, so this switch can be changed at any time during performance.

The Standby position is used in combination with the Power Switch (1) to 'warm up' the tubes before use, prolonging tube life. When powering up the amplifier, always engage the Power Switch first, being careful to leave the Standby switch on 'Standby'. This provides the voltage required to heat the valves to their correct operating temperature - hence the switch's name. After a couple of minutes the tubes will be warm enough to prevent damage, and the Standby Switch can be moved to the "SS" or "Tube Position".

In the "Tube" position, the GZ34 tube rectifies the voltage. This rectifier gives a looser bottom, and provides slightly less maximum power with some compression (the internal resistance of the GZ34 increases under loading, producing what is called in common nomenclature, "Sag").

In the "SS" position, the solid-state diodes rectify the voltage. The diodes used are actually FRED rectifiers, in an ISOTOP chassis mounted (internal) package. British amp enthusiasts hold FRED rectifiers in high-regards, as they provide a sweeter, slightly less stiff feel, than typical silicone diodes. This setting will be more powerful than the "Tube" setting, with a tighter bottom end having more bass frequencies, for sounds more modern than the original JTM45 amplifiers.

In order to prolong tube life, the "Standby" switch alone should also be used to turn the amplifier on and off during short breaks. When switching off your Soultone 45ME3, always put the Standby switch on the Standby position prior to switching the main Power Switch to Off.

4. Power Scaling POWER

The Power Scaling Variable Power Control changes the power output of the 45ME3, from 10mw at its fully counter-clockwise position, to 32 watts at its fully clockwise position, by changing the voltages supplied. The amplifier effectively becomes "smaller", hence the terminology "power scaling", by which it is referred to. By using this control, power tube distortion can be achieved at any appropriate volume level.

Special Note: This control must be fully clockwise when performing the bias procedure.

5. Power Scaling MASTER

As the size of the power amplifier is reduced with the POWER CONTROL, the signal being fed into it by the preamplifier appears larger in proportion to the power tubes, and can cause excessive distortion. The MASTER limit control is a Post Phase Inverter Master Volume control, consisting of dual ganged MILSPEC plastic conductive 3 watt potentiometers, implemented in a capacitive resistance network that removes voltages from the potentiometers, avoiding harmful

affectation of the bias supply, and providing a smooth variable control for the signal size being fed to the power amplifier. This control can be used to add or remove any level of preamp distortion!

Special Note: As the power scaled output tubes become smaller than 60%, having the Master limit control set too high can give even undesirable levels of distortion. Generally this control will never be used more than a couple notches higher than the POWER control. Experimentation is again advised!

6. PRESENCE

This control operates in the 45ME3's power section and adds high frequencies to your sound by altering the power amplifier's negative feedback. Turning this control clockwise adds more edge and 'sparkle', for a crisper, cutting sound.

Special Note: The 45ME3 presence control is affected by the amount of Negative Feedback provided by the NFB Switch on the rear of the amplifier. These two features should be adjusted in conjunction with one another.

7. BASS

This adjusts the bottom end of your amplifier; turning the control clockwise increases low frequencies.

8. FAT PUSH-PULL

The BASS control features a push-pull potentiometer, that when pulled out, engages a FAT feature. When engaged, this feature boosts the guitars signals at the second gain stage. Experimentation of the effects of this at different settings will reveal how subtle or dramatic this control can be.

9. MIDDLE

This adjusts the level of those all-important mid-range frequencies. Turning it clockwise increases the mids and fattens your sound, giving it more punch. Turning it counter-clockwise reduces the mids, producing a more 'scooped' tone.

Special Note: The shared tone network of the 45ME3 is post gain, passive and interactive – this means that the settings of the Treble and Bass control the range of the Middle control.

10. TREBLE

This adjusts the top-end. Turning it clockwise increases the amount of high frequencies (treble) present in the sound, making your instrument's tone brighter.

Special Note: The PRESENCE (6), BASS (7), MIDDLE (9) & TREBLE (10) tone controls are shared by Channel 1 and 2. They are very interactive (the changing of one control will change the way the others behave), so experimentation is highly recommended.

11. VOLUME ONE

Turning this control clockwise increases the overall output level of Channel One. This channel is voiced for a higher treble response than Channel Two.

12. BRIGHT PUSH-PULL

By pulling out on the VOLUME ONE push-pull potentiometer, further brightness at lower volumes is achieved.

13. VOLUME TWO

Turning this control clockwise increases the overall output level of Channel Two. This channel is voiced for a flatter response than Channel One.

14. CASCADE PUSH-PULL

Whereas bridging channels (see special notes below 15 through 18) gives parallel triodes, with a gain of 50+50, cascading them gives a gain of 50x50! By pulling on the push-pull potentiometer the output of **V1**a is fed into **V1**b, thereby adding a gain stage. The circuit values engaged are similar to those used in the very popular British amp of the early '80s. The Volume 1 and Volume 2 become gain controls for each stage, and the channel two Hi and Lo inputs are disconnected. This higher gain gives access to many of the hard rock and metal sounds of the 80s and 90s, furthering the flexibility of the 45ME3 amplifier. Cascading gain stages means to run them in series, one after the other.

15. HI SENSITIVITY INPUT FOR CHANNEL ONE

This is the 'Hi sensitivity' guitar input for Channel 1 (the bright channel controlled by Volume One) - and is the input usually used for a variety of guitars. Best results are attained using high-quality guitar cables.

16. LO SENSITIVITY INPUT FOR CHANNEL ONE

This is the LO SENSITIVITY guitar input for Channel One (the Normal channel controlled by Volume Two). It is a full 6dB lower in volume than the Hi Sensitivity input, and has a darker sound, caused by a lower input impedance.

Special Note: On vintage amplifiers of the late Fifties and Sixties, it was recommended to plug single coil pickups into the Hi Sensitivity inputs, and use the Lo Sensitivity inputs for instruments equipped with higher-output humbucking pickups. After guitarists of the mid to late Sixties began using the Hi Sensitivity input of the amplifiers with their humbucking pickup guitars, the sound of the guitar was morphed into what we now recognize as the signature of rock-and-roll.

17. HI SENSITIVITY INPUT FOR CHANNEL TWO

This is the 'Hi sensitivity' guitar input for Channel Two (the channel that is controlled by Volume Two) - and is the input usually used for a variety of guitars. Best results are attained using high-quality guitar cables.

18. LO SENSITIVITY INPUT FOR CHANNEL TWO

This is the LO SENSITIVITY guitar input for Channel Two. It is a full 6dB lower in volume than the Hi Sensitivity input, and has a darker sound, caused by a lower input impedance.

Special Note: Bridging Channels:
Because both Channels of the 45ME3 have the same number of gain stages (two) and are therefore in phase, you can bridge them together, and use both channels at the same time. By mixing the two channels together, you can further expand the amp's tonal possibilities. This is referred to commonly as "input jumping".

The most common way of doing this is by plugging your guitar into the top input of Channel One and then running a short guitar effects cable from Channel One's bottom input to the top input of Channel Two.

There is also a less commonly used method, which is plugging your guitar into Channel Two's top input and then running the cable from Channel Two's bottom input to Channel One's top input. Experimentation is again advised!

NOTE FOR CASCADING: When cascade is engaged, input jumping will not work, as the second channel triode is used.

Rear Panel Control Layout

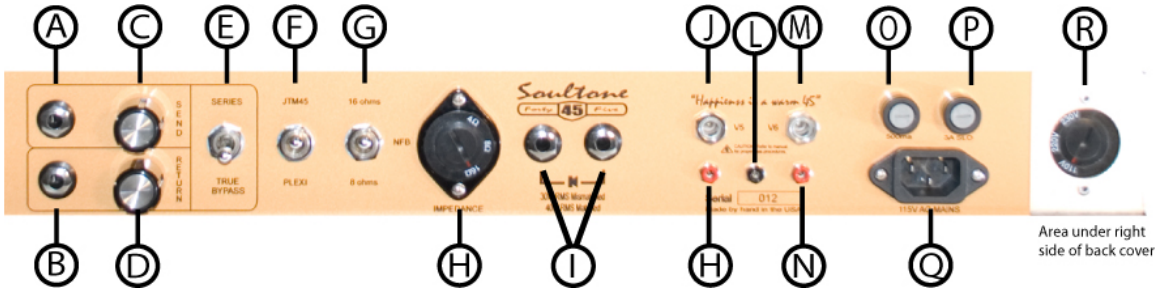

Figure 3. Rear panel layout

A. Effects Send Jack

This jack sends a signal of +4db from the preamp, and should be connected to the input of the first effects unit.

B. Effects Return Jack

This jack is used to return a signal from the last effects unit in the effects chain.

Special Note: Alternatively, a completely separate preamplifier can drive the 45ME3's power amplifier, either another amplifier's send unit, or a complete stand alone preamp, by inserting the signal into this jack. By doing this the only controls functional will be the Presence, Power-Scaling Power, and Power Scaling Master. The Effects Switch must be set to Series for this to function.

C. Effects Send Level

Use this control to adjust the level being sent to the effects unit from the Effects Send Jack.

D. Effects Return Level

Use this control to adjust the level being inserted to the 45ME3 power amplifier, from either an effects unit, or separate preamplifier.

E. Effects Bypass Switch

The Series position inserts the Effects Loop between the preamplifier output and the power amplifier input. Moving this switch to the True Bypass position, completely removes the loop, directly connecting the two sections of the amplifier together.

F. JTM45/PLEXI SWITCH

The JTM45/PLEXI switch changes the configuration of the first two gain stages of the amplifier, by modifying values in the circuit to match icons of either amplifier. The JTM45 position gives the loose bass response and gutsy blues drive of the earlier model JTM45, while the Plexi position gives a tighter bass response and brighter aggressive rock sound.

G. NFB Switch

The NFB switch Selects which tap of the Output Transformer is used for the Negative Feedback signal. This control effectively changes the clean headroom of the amplifier. In the interest of emulating the full range of early plexi amplifiers, it can be used in either the Plexi or JTM45 mode. Generally, the Plexi amps used the 8 ohm transformer tap, while the JTM45 used the 16, for greater headroom.

H. IMPEDANCE SELECTOR

The impedance selector matches the amplifier's output transformer to the speaker impedance.

CAUTION

Your 45ME3 should be in the Standby Mode before the Output Impedance Selector is turned. The amplifier must be 1) connected to a load while in either Tube or SS Mode, and 2) the impedance selected must match the impedance of the speakers being powered, as discussed below. Failure to follow these simply measures can damage the output transformer of your amplifier.

Special Note: The table below is crucial information if you have changed your tube types from the standard supplied tubes that your amplifier shipped with. The 45ME3 ships standard with Saratov KT66 tubes or Winged-C EL34 tubes, specified when ordered.

Examine the table, in Figure 4, to determine the correct impedance matching for the tubes you are operating and the extension cabinets you will be powering. If you are using the tube compliment your amplifier shipped with, you need only set your impedance selector to match the total impedance of your speaker load (traditional settings).

Cabinet(s)	Speaker Output(s)	45ME3 Tube Options	
		EL34 Selector is set to:	KT66 Selector is set to:
1x16 ohm	either	1 notch past 16**	16
2x16 ohm	both	16	8
1x8 ohm	either	16	8
2x8 ohm	both	8	4
1x4 ohm	either	8	4

Figure 4. Impedance Selector Settings

* This setting is not allowed, as there is either no transformer tap to accommodate it, or the resulting load reflected through the transformer to the power tubes could damage the tubes or other amplifier components.
** The position directly following 16 is internally connected to an additional tap to accommodate this setting. It should be used only as described above.

Special Note: Tube mixing is allowed, however, as the KT66 needs to see the correct impedance, which is reflected back from the secondary winding of the output transformer, any combination using KT66 tubes must use the KT66 settings described above. All other combinations will use the EL34 settings.

6V6GT Tubes: The 6V6GT tubes can use the settings specified for either KT66 or EL34 type tubes in the table above. Although not seeing the optimal load, the 6V6GT tubes will operate within specified tolerances. And their lower power output cannot harm the transformer. The closest match to the optimal load of the 6V6GT tubes will be the KT66 settings above, which provides a 7.2K primary.

CAUTION

Never use the amplifier without a load attached! Always put the amplifier on Standby, or Power Off, when changing speaker connections.

I. SPEAKER OUTPUTS

There are two parallel loudspeaker output jacks provided for connection to speaker extension cabinet(s). Please always ensure that the amplifier's output impedance selector is set correctly (see item 2) and ALWAYS ensure you use good quality speaker (unshielded) cables. NEVER use guitar (shielded) cables. Always use a non-screened Marshall approved speaker lead when connecting an extension cabinet to these units.

CAUTION

Prior to attempting to bias your amplifier, read the sections of this manual titled "Front Panel Control Layout", and "Rear Panel Control Layout", taking the time to acquaint yourself with the name and location of the appropriate controls and measurement points, and then completely read the section titled "Bias Procedure", following this section.

J. V5 BIAS CONTROL

The potentiometer at this position adjusts the bias level for the **V5** power tube. A clockwise motion will increase the bias supply to the tube, and a counter-clockwise motion will decrease it.

K. V5 BIAS MEASUREMENT JACK

Inserting the positive lead (usually a RED colored test lead) of the customer supplied Voltage Meter here will read the bias of the V5 tube, in millivolts where one millivolt (mV) is equal to one milliamp (mA).

L. BIAS MEASUREMENT COMMON JACK

The common lead of the Voltage Meter (usually a BLACK colored test lead) will be attached here when measuring the bias.

M. V6 BIAS CONTROL

This potentiometer adjusts the bias level for the **V6** power tube. A clockwise motion will increase the bias supply to the tube, and a counter-clockwise motion will decrease it.

N. V6 BIAS MEASUREMENT JACK

Inserting the positive lead (usually a RED colored test lead) of the customer supplied Voltage Meter here will read the bias of the V6 tube, in millivolts where one millivolt (mV) is equal to one milliamp (mA).

O. HIGH TENSION FUSE

The value of the HIGH TENSION FUSE is specified on the rear panel of the amplifier. Always use the correct value fuse.

P. MAIN POWER FUSE

The value of the MAIN POWER FUSE is specified on the rear panel of the amplifier. Always use the correct value fuse.

CAUTION

If the either fuse blows again shortly after replacement, having used the power on instructions in this manual, under "Front Panel Control Layout", either immediately after powering on the amplifier, or after switching the amplifier from Standby to Play, contact Soultone for service. The problem could be as minor as defective tubes, or serious enough to warrant immediate service. We'll be glad to assist you in determining the most appropriate course of action.

Q. MAINS INPUT

The amplifier is equipped with an industry standard IEC power receptacle, for use with a detachable 18ga appliance cord. The specific operating voltage of your amplifier is specified on the back panel. Before connecting to the local power for the first time, please ensure that your amplifier is compatible with the AC voltage supplied, by adjusting R, the Mains Voltage Selector.

R. MAINS VOLTAGE SELECTOR

The amplifier is equipped with a voltage selector, for matching to your country specific power. Before connecting to the local power for the first time, determine the correct AC voltage being supplied, and turn the dial to the correct setting. There are two unmarked positions on the dial, for 100V and 240V operation. The 100V position is for Japan use, and is the unmarked position directly before the 11OV (120V common) operation. The 240V position is directly following the 230V position on the selector.

Sample Settings

The following settings can be used to establish some baseline sounds from your amplifier, and can be experimented with further to learn more of its capabilities and help you find the sound you are seeking.

Key: "X" is use, "-" is not used, "A" indicates any setting, and "1-10" means the optimal position for that control.

Blank rows are provided for you to keep track of your own settings.

	PS-Power	PS-Master	Presence	Bass	Fat	Middle	Treble	Volume 1	Bright	Volume 2	Jumper	Cascade	NFB	V5 Tube Type	V6 tube type
JTM45	A	A	7	6	-	7	8	A	x	A	x	-	16	KT66	KT66
Plexi	A	A	9	5	-	9	9	A	x	A	x	-	8	EL34	EL34
2204	A	A	A	6	x	5	9	6	-	A	-	x	8	EL34	EL34

If you would like to share any of your settings, please forward them to Soultone, and they will be printed in future revisions of this manual.

Biasing the 45ME3 Amplifier

Thanks to its back panel bias control and measurement cluster with separate bias controls for each power tube, the bias procedure for the Soultone 45ME3 is relatively simple. Nevertheless, care should be taken when performing this bias procedure, with respect to the following cautions.

CAUTION

Do not attempt to bias the amplifier in an uncovered area, a wet area, or while standing in water. Take care to not touch any metal parts when performing the bias. Always allow the tubes to cool off before removing or replacing tubes.

The following bias settings should be used for the appropriate model of 45ME3 amplifiers. The columns marked 60% are the optimal bias settings, however the tubes can be biased anywhere from the minimum to the maximum values shown (the 70% column is preferred by many players).

BIAS ALL TUBES IN SS POSITION	405V		
	50%	60%	70%
KT66	30.9	37	43.2
EL34	30.9	37	43.2
6L6	37	44.4	51.9
5881	28.4	34.1	39.8
6V6	17.3	20.7	24.2

Figure 5. Bias Table

Special Note: Using different tube types can produce more hum than using the same type in each position. If the same tube type is used in V5 and V6, set the bias control for each as close as possible to one another, to further minimize hum.

Actual Bias Procedure

This bias procedure assumes you have changed tubes to the desired tube types, following the procedures in "Changing your Amplifier Tubes", or that you already have the desired tube types installed, and are merely re-biasing your amplifier.

In order to perform this procedure, you will need a digital or analog Voltage Meter, capable of reading millivolts from 1mV to 100mV, and a small screwdriver, preferably plastic, or metal with an insulated plastic handle.

V5 Bias:

Step One: With the amplifier powered completely off, connect your amplifier to a properly matched speaker load, using the settings located in this manual in "Figure 4. Impedance Selector Settings".

Step Two: Locate the power tube type inserted in V5 in "Figure 6. Bias Table". Read across the column to locate your amplifier and rectifier type, and then take note of the Minimum, 60% (optimal), and Maximum settings.

Step Three: Turn the Power Scaling POWER control fully clockwise. Turn the Power Scaling MASTER control fully counter-clockwise.

Step Four: Connect your Voltage Meter's positive (RED) test lead to the V5 BIAS MEASUREMENT JACK (the leftmost RED test jack), and the Voltage Meter's negative (BLACK) test lead to the BIAS MEASUREMENT COMMON JACK (the center black jack). If your meter is not auto-ranging, set it to a range for 1-100mv, and turn the meter on.

Step Five: Turn on the power switch, and after waiting a suitable time for the tubes to warm up, turn the standby switch to the SS position. NOTE: The amplifier should only be biased in the SS position, unless the amp will NOT be used in SS position without rebiasing.

Step Six: Adjust the V5 BIAS CONTROL so the meter displays the specified readout in millivolts.

V6 Bias:
Step One: Switch the amplifier Standby Switch to STANDBY, and move the Voltage Meter's positive test lead (red) to the V6 BIAS MEASUREMENT JACK (the rightmost red jack).

Step Two: Locate the power tube type inserted in V6 in "Figure 6. Tube Type Bias Table". Read across the column to locate your amplifier and rectifier type, and then take note of the Minimum, 60% (optimal), and Maximum settings.

Step Three: Switch the Amplifier Standby Switch to PLAY.

Step Four: Adjust the V6 BIAS CONTROL so the meter displays the specified readout in millivolts.

Step Five: Disconnect the meter leads, and store your meter. You may now audition the amplifier sound with the tube types you have selected.

Changing Tubes

Your 45ME3 amplifier shipped with specially selected tubes from Soultone, however a great variety of tonal variation can be experienced by replacing these tubes with different tube brands and types, both modern production and valuable New Old Stock (NOS).

All tube types for this amplifier are keyed by their pins, on preamplifier tubes, or by a keyed insertion base, on the power tubes. Be sure to only attempt insertion of tubes with them keyed in the proper orientation.

1. Turn off the amplifier, and remove the power cord.
2. Remove the back panel by removing the four Philips head screws, gently pulling it off, and carefully setting it aside.
3. Remove the tube shield of the preamp tube you are replacing, and carefully set it aside.
4. If you are removing a preamp tube, gently pull in an upward motion on the tube. Sometimes a slight wiggle will help free it from the base.
5. If you are removing a power tube, you will need to spread open the retaining clamp with one hand and, by grabbing the base of the tube with the other, pull slowly upward on the tube.
6. Carefully examine the tube socket, studying the orientation of the pin holes, or the keyhole for the power tube.
7. Remove any debris from the tube socket prior to inserting tubes.
8. If you are inserting a power tube, you will need to use one hand to spread open the retaining device.
9. Holding the tube in the proper orientation to the base, by studying the pins on the preamplifier tube, or the key device on the power tube base, and carefully insert the tube into the base.
10. Reinstall the tube shields, where appropriate.
11. Reinstall the back cover.
12. If you have only changed a preamplifier tube, you do not need to check your bias, prior to powering on the amplifier.
13. Regardless of whether or not you changed tube types, if you have replaced either power tube, you must complete the Bias Procedure outlined in this manual.

Care and Maintenance

By following the instructions laid forth in this manual, your amplifier should become a family heirloom. The only additional steps to take are in regards to its physical appearance.

Always switch the Power Switch to the OFF position, and disconnect the AC MAINS cord, prior to cleaning your amp.

The vinyl covering on your amp should be dusted with a dry, soft, cloth. Tougher stains should be cleaned using only a slightly damp, well-wrung, cloth. Stains that are difficult to remove may be treated by a solution of 1 teaspoon non-scented liquid soap to ½ gallon water, and then rinsed with a separate damp, well-wrung, cloth.

WARNING: Never use car-care products, solvents, or abrasives, on your amplifier.

Warranty and Information

Should you experience a problem with your amplifier, other than tubes or fuses, switch it off immediately and contact Soultone Amplification, Inc., to arrange service.

Soultone HD-MILSPEC Amplifiers carry a Limited Lifetime Warranty, protecting the original owner from manufacturing defects. This warranty does not cover damage resulting from abuse, improper use. If your amplifier is under warranty, be sure to contact Soultone to arrange for authorized service. In the event that you own a Soultone amplifier not covered by a warranty, we will help you get your amplifier repaired at a reasonable price by authorized service personnel. Soultone will not be responsible for any repairs done to products without prior authorization.

NOTE: You must save the original double boxed shipping containers that your amplifier was shipped with.

Amplifiers shipped for service that needs to be performed by Soultone, such as transformer replacement, or feature modification, that are shipped in any other shipping solution not provided by Soultone, will not be covered for damage if damaged during shipment.

The full details on your Soultone amplifier's warranty can be found online, or in the paperwork your amplifier shipped with.

Manufacturer Liability

Soultone Amplification, Inc., will not be liable for any losses incurred due to the misuse of its products, failure of said products to operate, or premature failure of products, and Soultone Amplification's liability in the result of damage or losses caused by a defective or inoperable amplifier shall be limited to the replacement, or value, of said amplifier. Use of this product constitutes acceptance of this manufacturer's statement of liability.

Return Merchandise Authorization

If your instrument amplifier needs repair, obtain a Return Merchandise Authorization Number (RMA) from Soultone, by contacting service@soultoneamps.com. When you receive your RMA Number, you will be told if your amp can be locally repaired where the service facility is that has been authorized to perform the repairs.

If the repair will require factory services, you will need to return your amplifier to Soultone. Power off your amplifier, then remove the power cords, speaker cable, and all tubes, then pack only the amplifier, with the bubble wrap protecting your amplifier in the inside smaller box, which is to be sealed with packing tape, and placed in the outer shipping container with peanuts surrounding, and once again sealed with packing tape. If your amp is covered by warranty, you will be sent a shipping label, with all information needed. You will merely attach this label to the shipping container, and take the amplifier to the nearest shipping center, as instructed by Soultone.

For non-warranty repair, after obtaining the RMA and packing the amplifier, as instructed above, ship the amplifier to:

Soultone Amplification, Inc.
RMA (your RMA number here)
3340 South Oleander Dr
Chandler, AZ 85248